Cincinnati Children's
change the outcome

Critical Care Medicine

Division Photo

Front Row: J. Kaplan, K. Page, E. Stalets, B. Zingarelli, L. Doughty, B. Varisco. Back Row: D. Wheeler, H. Wong, R. Basu, K. Tegtmeyer, R. Barr, R. Chima, S. Poynter-Wong

Division Data Summary

Research and Training Details	
Number of Faculty	12
Number of Joint Appointment Faculty	1
Number of Research Fellows	11
Direct Annual Grant Support	$3,751,503
Peer Reviewed Publications	24
Clinical Activities and Training	
Number of Clinical Staff	10
Number of Clinical Fellows	11
Inpatient Encounters	8,729

Significant Publications

Zingarelli B, Chima R, O'Connor M, Piraine G, Denenberg A, Hake PW. Liver apoptosis is age-dependent and is reduced by activation of peroxisome proliferator activated receptor-{gamma} in hemorrhagic shock. Am J Physiol Gastrointest Liver Physiol 2009 Nov 19 [Epub ahead of print] 298:133-134

This manuscript further established that liver injury following hemorrhagic shock is dependent on developmental age, which has important implications for the development of age specific therapies.

Kaplan JM, Denenberg A, Monaco M, Nowell, M, Wong H, Zingarelli B. Changes in peroxisome proliferator-activated receptor-gamma activity in children with septic shock. Intensive Care Med 2010 Jan; 36(1) 123-30. Epub 2009 Sept 17.

This manuscript demonstrated for the first time that PPAR-gamma activation occurs in the blood compartment of children with septic shock. Coupled with a wealth of other experimental data from the Divisional laboratories, these clinical data have provided the foundation for an FDA application to conduct a Phase 1 pharmacologic trial of PPAR-

gamma activation in children with septic shock

Nowak JE, Brilli RJ, Lake MR, Sparling KW, Butcher J, Schulte M, Wheeler DS. Reducing catheter-associated bloodstream infections in the pediatric intensive care unit: Business case for quality improvement. Pediatric Crit Care Med. 2010 Mar 19 [Epub ahead of print]

This manuscript has provided clear financial data documenting the potential substantial cost savings that can be achieved by reducing catheter related blood stream infections in the PICU. A major quality initiative in the PICU is the reduction of nosocomial catheter related blood stream infections.

Page K, Ledford JR, Zhou P, Wills-Karp M. A TLR2 agonist in German cockroach frass activates MMP-9 release and is protective against allergic inflammation in mice. J Immunol 2009 Sep 1;183(5):3400-8. Epub 2009 Aug 10.

This manuscript demonstrated a protective role of Toll like receptor 2 and matrix metalloendopeptidase 9 in mice with experimental acute allergic airway inflammation. The data may have important implications for allergen induced astha.

Wong HR, Cvijanovich N, Lin R, Allen GL, Thomas NJ, Willson DF, Freishtat RJ, Anas N, Meyer K, Checchia PA, Monaco M, Odom K, Shanley TP. Identification of pediatric septic shock subclasses based on genome-wide expression profiling. BMC Med 2009 July 22;7:34

This manuscript demonstrated the existence of sub-classes of children with septic shock based exclusively on gene expression profiles generated during the first 24 hours of admission to the PICU. One of the expression based subclasses has a significantly higher level of illness severity and a higher mortality rate, thus providing the opportunity to risk stratify patients early in the course of septic shock.

Division Highlights

Kristen Page, Ph.D.

Dr. Page received one of two Schmidlapp Scholar Awards from the Firth Third Bank/Charlotte R. Schmidlapp Women Scholars Program in fiscal year 2010

Jennifer M. Kaplan, MD, MS

Dr. Kaplan was awarded a Mentored Clinical Scientist Development Award from the National Institute of General Medical Sciences

Hector R. Wong, MD

Dr. Wong was awarded a Challenge Grant from the National Heart, Lung, and Blood Institute to develop a multi-biomarker based pediatric sepsis risk model.

Faculty Members

Hector Wong, MD, Professor ; *Director*
Research Interests: Septic shock, Genomics, Biomarkers

Eman Al-Khadra, MD, Assistant Professor
Research Interests: Bacterial Pneumonia

Richard Brilli, MD, Professor Clinical
Research Interests: Quality Improvement BSI, VAP

Ranjit Chima, MD, Research Assistant Professor ; *Lung injury/inflammation/Hemorrhagic Shock*
Research Interests: Lung Injury/Inflammation, Hemorrhagic Shock

Lesley Doughty, MD, Associate Professor ; *Fellowship Director*
Research Interests: Sepsis

Jennifer Kaplan, MD, Assistant Professor
Research Interests: Sepsis

Kristen Page, PhD, Associate Professor
Research Interests: Asthma, airway inflammation, inflammatory mediators

Sue E. Poynter, MD, Assistant Professor ; *Medical Director Division of Respiratory Care;*
Research Interests: Acute lung injury, resident education

Ken Tegtmeyer, MD, Associate Professor Clinical
Research Interests: Multimedia Medical Education

Derek S. Wheeler, MD, Assistant Professor Clinical ; *Clinical Director*
Research Interests: Sepsis,Stress preconditioning, Quality Improvement

Basilia Zingarelli, MD, Associate Professor
Research Interests: Sepsis, hemorrhage and ischemia and reperfusion injury

Trainees

- **Jeffrey Nowak, ,** PL-9, University of Minnesota
- **Erika Stalets, ,** PL-8, University of Tennessee Health Sciences Center
- **Scottie Day, ,** PL-7, Indiana University
- **Elizabeth Mack, ,** PL-6, Palmetto Richland University
- **Donna Claes, ,** PL-5, CCHMC & University of Missouri
- **Rodney Daniels, ,** PL-5, Albany Medical Center
- **Derrick Dauplaise, ,** PL-5, CCHMC & University of South Florida
- **Sarah Norris, ,** PL-5, Medical College of Georgia
- **Stephen Standage, ,** PL-4, Childrens Hospital of Philadalphia
- **Sandeep Tripathi, ,** PL-4, Suny Downstate
- **Erik Mikkelsen, ,** PL-5, Children's Mercy Hospital

Significant Accomplishments

Improving outcomes

Our 35-bed Pediatric Intensive Care Unit (PICU) provides care for more than 2,000 critically ill infants and children per year. This year, the standardized mortality ratio for the PICU, which compares actual deaths to a predicted number of deaths based on severity-of-illness adjustment, showed that our death rate was lower than predicted, ranging between 0.4 and 1. In addition, our rates of catheter-associated blood stream infections and ventilator-associated pneumonia consistently rank among the lowest in the country.

Medical response team

Our division also made strides in preventing other critical events. The hospital-wide medical response team (MRT) was activated 265 times this year, an all-time high for the medical center. As a result, there has been only 1 MRT-preventable code at Cincinnati Children's since mid-2007. We remain closely involved with the situational awareness initiative, which has significantly reduced the rate of unplanned critical transfers to the PICU.

Dr. Barr joins the team

This year, we welcomed Frederick (Rick) Barr, MD, MSCI, to our division. Barr served as director of Pediatric Critical Care Medicine at Vanderbilt University since 2007. At Cincinnati Children's, he will serve as program director for the Clinical Translational Research Center at Cincinnati Children's and will be charged with expanding clinical research efforts within the PICU.

Division Publications

1. :

Grants, Contracts, and Industry Agreements

Grant and Contract Awards		Annual Direct / Project Period Direct
Barr, F		
Cincinnati Center for Clinical & Translational Sciences and Training - CTRC University of Cincinnati (National Institutes of Health)		
UL1 RR 026314	04/03/09 - 03/31/14	$1,892,492 / $1,892,492
Chima, R		
C-peptide: A Novel Anti-Inflammatory Peptide Inhibitor Shock Society		
	09/01/08 - 08/31/10	$30,000 / $60,000
Day, S		
Training Support University of Cincinnati		
	07/01/09 - 06/30/10	$51,552 / $51,552
Doughty, L		

Interferon-Mediated Reprogramming of Toll-like Receptor Signaling
National Institutes of Health
R01 GM 085063 08/01/08 - 05/31/13 $188,100 / $944,300

Kaplan, J

PPAR gamma in Pediatric Sepsis and the Inflammatory Response in Obesity
National Institutes of Health
K08 GM 093135 06/01/10 - 05/31/14 $115,250 / $461,000

Wheeler, D

The Immunomodulatory Effects of Extracellular HSP 70
National Institutes of Health
K08 GM 077432 04/01/06 - 03/31/11 $112,500 / $450,000

The Host Response to Calfactant for Direct Acute Lung Injury in Critically Ill Children
National Institutes of Health
R03 HD 058246 07/01/08 - 06/30/10 $50,000 / $100,000

Therapeutic Hypothermia after Pediatric Cardiac Arrest
University of Michigan (National Institutes of Health)
U01 HL 094345 09/01/09 - 06/30/14 $28,378 / $145,424

Therapeutic Hypothermia after Cardiac Arrest
University of Michigan (National Heart, Lung & Blood Institute)
U01HL094345 09/01/2009 - 08/31/2014 $5,236 / $172,115

Wong, H

Genomic Analysis of Pediatric SIRS and Septic Shock
National Institutes of Health
R01 GM 064619 09/01/07 - 08/31/11 $223,551 / $664,447

Point of Care Center for Emerging Neurotechnologies
University of Cincinnati (National Institutes of Health)
U54 EB 007954 07/01/09 - 06/30/10 $12,572 / $12,572

Pediatric Sepsis Biomarker Risk Model
National Institutes of Health
RC1 HL 100474 09/30/09 - 08/30/11 $333,300 / $666,362

Genomic Analysis of Pediatric SIRS and Septic Shock
National Institutes of Health
R01 GM 064619 09/30/2009 - 08/31/2011 $236,275 / $236,275

Zingarelli, B

Mechanisms of Age-Related Inflammatory Response in Hemorrhagic Shock
National Institutes of Health
R01 AG 027990 09/01/2007 - 08/31/2012 $200,900 / $1,008,600

PPARgamma and PPARgamma Agonists in Septic Shock
National Institutes of Health
R01 GM 067202 07/01/2008 - 06/30/2012 $247,080 / $983,378

Role of Eicosanoids in Shock
Medical University of South Carolina (National Institutes of Health)
R01 GM 027673 07/03/2008 - 06/30/2013 $24,317 / $48,878

Current Year Direct $3,751,503

Total $3,751,503